

"Laryngeal Vertigo."

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“LARYNGEAL VERTIGO.” *

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At a meeting of the Société de biologie in 1876, M. Charcot, during a discussion on a case of sudden death after thoracentesis, narrated the history of two patients in whom marked cerebral disturbance followed and seemed in some way dependent upon an attack of cough. The publication of these cases has been followed by others from Gasquet, Charcot again, Krishaber, Gray, Lefferts, McBride, Russell, and Massei. The distinguishing feature of the cases described has been that an attack of cough was immediately followed by giddiness, and also in all but two cases by momentary loss of consciousness, the patient fully recovering himself at once without any mental obscuration.

While it is the opinion of the writer that attacks of dizziness after cough are comparatively frequent, and temporary loss of consciousness probably not so rare as has been supposed, the fact remains that little attention has been accorded the subject, and it seems desirable to analyze reported cases, and record others, with the object, if possible, of explaining the mode of dependence of the cerebral symptoms upon the cough.

* Read before the American Laryngological Association, May 27, 1886.

We have fourteen published cases on record, and these, with two which I shall add, will form the basis of my paper. I shall not weary you with any prolonged history of these cases, but simply give their essential points as far as I could obtain them.

A gentleman, forty-two years old, consulted me recently for a general bronchitis of about a year's duration. He was a man of robust physique, both his parents being still alive and well. He remembers that, when a boy, his head used to be held under the water-faucet by his father for what was called "congestion." He studied hard, and at one time in college suffered from insomnia. He lost a brother at the age of twenty-seven from inflammatory rheumatism, and had himself suffered an attack of this disease at the age of fifteen. He had been for a considerable time under great mental strain in the direction of enormous financial matters through very troublous times. He consulted me more on account of the urgency of his family physician than from any discomfort of his own, for he said that his cough at the time was not particularly troublesome; I found, on examination, his pulse to be seventy-six in the minute and regular. There were no morbid signs discoverable by auscultation of the heart. The chest, however, was filled with sonorous and sibilant râles. He was put upon the iodide of potassium, the dose of which was gradually increased from ten to thirty grains three times a day, and a laxative for the bowels. The wheezing and cough began to improve at once, but on one occasion, after a day of great worry and fatigue, he had a fit of coughing, which was followed by loss of consciousness. He did not fall down, as he was sitting in a chair at the time, and his wife, who was near, caught him in her arms. There was no evidence of spasm of the glottis, there were no convulsive movements, and he quickly recovered full consciousness. He continued to improve under treatment, which, besides the iodide, included a small dose of strychnine and the removal of a small mucous polyp from one nostril, until he was comparatively well. He never had loss of consciousness but once, but has

since informed me that, judging from his own sensations, he has often come near it.

The second case which has come to my knowledge occurred in the practice of Dr. J. P. Oliver, of Boston.

The patient was a widow, forty-seven years of age, who had been subject to attacks of dizziness in connection with digestive derangements. She had a granular pharyngitis, and had been subject to winter cough for ten years. During one attack of cough she became dizzy, and then lost consciousness. There was marked congestion of face and neck at the time. She was always relieved of the cough by the local use of weak astringents. She never had loss of consciousness but once.

Most of the records of cases, having been made without reference to special investigation, are more or less deficient in points about which more accurate and fuller information would be very desirable, but such important facts as are given I will tabulate.

In the matter of sex, a curious fact strikes the eye in that all the reported cases but one have occurred in men, one female having been added to the roll by myself to-day.

The average age of the thirteen whose ages are given is forty-nine and seven thirteenths.

The cough which introduced the attack was described as slight in six cases, spasmodic or a fit of cough in two, and a severe fit of cough in three. This was said to be preceded by burning, in addition to the usual tickling, in the larynx in three cases.

Momentary loss of consciousness is stated as having occurred in fourteen cases; one patient fell, but declared he was not unconscious; and in another (McBride's) there was never loss of consciousness. Such a record as this, I feel convinced, happens because only the severe cases attracted sufficient attention to cause their publication.

Dizziness was mentioned in eleven cases, and in six it was stated as sometimes occurring after cough without any subsequent loss of consciousness. Two patients had been subject to dizziness previously without cough.

In four patients there seems to have been decided evidence of a laryngeal spasm; in one this seems doubtful. Krishaber says that in his case there was, besides the spasm of the larynx, a sudden arrest of all the muscles of respiration. Once his patient was strangled by tobacco-smoke accidentally blown into his face, and could not breathe for several seconds, suffering intensely, but he did not on this occasion lose consciousness.

There was marked congestion of the head and face in four patients, while one was said to be pale, and another very pale.

There were convulsive movements of the limbs in three cases; in one of these also of the head, and in another of the face.

It is distinctly stated in seven cases that there was no mental confusion immediately after the attack; in one the patient was said to be giddy and confused "for some little while," and in one there was said to be slight mental confusion afterward.

In six cases it is stated that the patients were personally free from other evidences of nervous disease, and in four there were such evidences. In Krishaber's case the first loss of consciousness occurred from sudden emotion, and was not preceded by cough. Subsequent attacks, even though caused by emotion, were preceded by cough. In McBride's case there was a tendency to spasm, exaggerated tendon reflex, ankle clonus, spasmodic action of palate muscles, and stricture of the gullet. Gray's patient had been subject, seventeen years before, after a scalp-wound by a bullet, to losses of consciousness like the present, but with-

out cough, which continued for two months. Russell's patient was stated to be of a decidedly nervous constitution.

In regard to other evidence of disease, five patients are stated to have had chronic bronchitis, three to have had simply a cough, two had gout or rheumatism, one had syphilis, one had diabetes, and one probably had catarrhal pneumonia.

In none of the attacks was there any biting of the tongue, frothing at the mouth, or involuntary micturition.

Local examination showed hyperæmia of the larynx in six cases, granular pharynx in four, and was negative in two cases.

The record shows that in seven cases treatment relieved the patient, temporarily at least, of the symptoms under discussion. The most common forms of treatment were by astringents to the pharynx, counter-irritation over the larynx, and the administration of bromides internally.

I have announced the subject of my paper as “Laryngeal Vertigo” because Chareot has called attention to his cases under this name, and because, while I believe it to be an entirely erroneous designation, other names which have been proposed are also open to the objection that the nature of the affection is unwarrantably assumed by using them. Krishaber reports his case, for instance, under the title “Spasm of the Glottis in the Adult.” Gray designates the affection “Laryngeal Epilepsy,” while McBride strengthens Krishaber's definition by calling it “Complete Spasm of the Glottis in the Adult.”

Now, in the first place, it is necessary for us to consider if there is evidence in the cases reported of what can properly be called vertigo. I think not. If any one of my hearers has seen, or had described, or will get a patient with aural vertigo to describe an attack to him, I believe he will agree with me. Let us see what the usual

train of symptoms in Ménière's disease is. First a tinnitus aurium, then the surrounding objects begin to revolve round and round, or over and over, or the patient feels as if going round himself; he reels if walking, and finally may fall, but seldom becomes unconscious, and ends with an attack of nausea and vomiting. A reflex aural vertigo presents much the same course, only tinnitus aurium is not so commonly a precursor. I think, from a comparison of this statement with the history of our cases, it will be evident that they do not present what can properly be called a vertigo, but simply a giddiness, or, as it is sometimes called, a lightness of the head, a mild degree of which nearly every one has felt after coughing or making prolonged expiratory effort of any kind. If it were a real vertigo, a serious disturbance of equilibration, an easy explanation of its occurrence would be to place it in the same category as the stomachic vertigo; in fact, an aural reflex, brought about by the connection of the pneumogastric with the labyrinth through the sympathetic.

Let us consider for a moment now the question of epilepsy. It is evident that none of the cases presented the severe form of this disease. There was no biting of the tongue, no frothing at the mouth, no involuntary micturition, and no mental impairment afterward.

May we class the attack, as Gray would have us, as one of "le petit mal"? If, as Gray suggests, we use the term epilepsy in its more catholic sense (as Hughlings Jackson employs it) when speaking of all sudden actions of nerve-cells, then we could not exclude from this category any case of temporary loss of consciousness, no matter what intermediate mechanism there might be, and such decidedly neurotic cases as Gray's and Krishaber's might well be here placed. It will be remembered that Gray's patient had similar attacks, years before, after a scalp wound, and that

Krishaber's patient had his first attack of loss of consciousness after sudden emotion, without any previous cough.

The fact of loss of consciousness, however, does not compel us to consider a case epileptic, for asphyxia and syncope may produce temporary unconsciousness. Neither does the fact that there were convulsive movements of limbs in three cases make them epileptic, for convulsions are by no means rare in the laryngismus and whooping-cough of children. There is no doubt about the possibility of the production of “reflex epilepsy” by a pediculated polyp in the larynx, as shown by Sommerbrodt's case.* This patient had, without doubt, genuine epileptic attacks with all the characteristic symptoms and results, which disappeared at once after the removal of the polyp. The same patient, fifteen years before, had a short series of epileptic attacks, which were attributed to a cicatrix in the dorsal surface of the right hand, and which disappeared after the excision of the cicatrix. Other similar cases are well known.

The question for us, however, is whether such an explanation is necessary for cases of loss of consciousness following cough. While I do not deny that mild epileptic attacks *may* originate from slight sources of irritation in the larynx, it seems to me that we have more reasonable explanation in other ways.

Our profession has long been familiar with loss of consciousness in sudden spasm of the glottis, notably in cases of foreign body in the larynx, but also in children with laryngismus and whooping-cough.

Let us, then, look at the possible mechanism of dizziness and loss of consciousness through the agency of spasm of the glottis. Proof of the occurrence of spasm of the glottis, however, is given in but few of our cases. The best presentation of this theory has been given by McBride.

McBride assumes that in every case the attack was "preceded by a short cough, or, in other words, by a series of spasmodic inspirations, followed by spasmodic expiration with partially closed glottis."*

McBride believes the attack to be due to the physical condition within the thoracic cavity caused by a complete spasm of the glottis occurring just after a full inspiration. He gives sphygmographic tracings showing the effect on the pulse of taking a deep inspiration, and then attempting to perform the expiratory act with the glottis closed. The result is an almost complete obliteration of the pulse tracing, and one of the gentlemen experimented upon experienced a momentary threatening of syncope just after one of the tracings was taken. McBride says that the increased atmospheric pressure on the walls of the alveoli will in all probability prevent, or tend to prevent, the free passage of blood through the lungs, and therefore lessen the blood in the left side of the heart, and the pressure on the large intra-thoracic veins must hinder the return of venous blood, and thus we can understand that the face will be pale or turgid, according as the spasm of the glottis lasts for a longer or shorter time. He says it is also quite conceivable that the compression of the heart between the unyielding lungs and the chest-wall may help to paralyze its action. The possibility of the compression of the pneumogastric in certain cases, and thus inhibition of the heart's action, will also occur to us, and recalls to mind the ease with which Czermak was said to stop the action of his heart at will by pressing his pneumogastric against an osseous tumor of the neck.

McBride quotes from the very interesting article of

* As I have before stated, Krishaber's patient had his first attack without precedent cough, which may place this one attack at least in a different category.

Weber* to substantiate his theory. Weber points out that forced expiration with closed glottis causes weakening, and eventually stoppage, of the heart's action. He shows by experiments that if severe pressure be exercised, even by the expiratory muscles alone, the pulse, because the supply of blood to the heart through the *venæ cavæ* is cut off, immediately becomes small, but continues until the blood contained in the thorax has emptied itself through the left side of the heart into the aorta. Then, usually after three to five beats, the pulse stops altogether, because no blood reaches the aorta from the empty heart, and only returns after the compression of the thorax has ceased. On one occasion Weber, while experimenting on himself, produced actual syncope. During the interval of unconsciousness slight convulsive twitchings of the face were noticed by the bystanders, and, as consciousness returned, all recollection of what had taken place was so obliterated that, in spite of the fact that his pulse was being counted aloud as before, he could not at first remember where he was and what was happening.

Blowing on certain wind instruments is a similar procedure, and this, as is well known, often produces very uncomfortable sensations in the head.

Now, inasmuch as conclusive evidence of spasm of the glottis is absent in the majority of cases reported, it becomes us to consider whether such spasm is really necessary for the production of the symptoms under consideration. I believe sufficient disturbance of the cerebral circulation can be produced by the forced expiration of cough, or by rapid respiration, to cause dizziness, or even momentary loss of consciousness. I referred to this latter idea in the

* “Ueber ein Verfahren den Kreislauf des Blutes und die Function des Herzens willkürlich zu unterbrechen.” Müller's “Archiv,” 1851, p. 88.

discussion of Dr. Lefferts's paper, read before this association three years ago. Who that practices auscultation has not had patients become dizzy when they were made to keep up forced respiration a little too long?

In recent years we have been made familiar with the production of analgesia—*i. e.*, the deprivation of the sense of pain, without loss of the sense of touch or feeling, by rapid breathing of atmospheric air, through the writings of Dr. Bonwill and others, of this city. Dr. Hewson first called attention to this method of producing insensibility to pain for minor surgical operations under the name of Bonwill's method of inducing anæsthesia,* and Bonwill himself, later, tried to explain this mode of producing insensibility to pain.† As one cause he assigns the retention of carbonic acid in the blood, and quotes the well-known results of experiment: that the percentage of carbonic acid exhaled diminishes as the rate of respiration is increased, and infers from this that there is a retention of carbonic acid in the blood, and consequent asphyxia. This assumption is unjustifiable, as experiment has fully shown that, while the percentage of carbonic acid is diminished as the rate of respiration is increased, the total amount of carbonic acid is steadily increased. Whether so much more is generated by rapid respiration that, notwithstanding increased elimination, there still remains an abnormal amount in the blood, we do not know. Speek was unable to establish the fact, with increased absorption of oxygen under increased pressure, either of an increased oxidation on increased temperature, or an increased formation and expiration of carbonic acid. ‡

* "Philadelphia Medical Times," March 4, 1876.

† "Philadelphia Medical Times," July 17, 1880.

‡ Hassall, "The Inhalation Treatment of Diseases of the Organs of Respiration," London, 1885.

It is possible that the dizziness and other cerebral symptoms of rapid respiration are due, if in any way connected with the interchange of gases, to oxygen intoxication.

It seems, however, fair to assume that an excess of that condition, whatever it may be, which causes the peculiar sensations in the head of any one after forced breathing, and frequently after hard cough, may cause momentary unconsciousness.

To recapitulate. It is admitted that we have uncomfortable sensations in the head, and sometimes loss of consciousness following cough. The simplest explanation of the symptoms would seem to be that there is a direct disturbance of the cerebral circulation by compression of the large blood-vessels, and even of the heart itself.

The mechanism of this is easily understood when there is forced expiration against a glottis closed by spasm. With cough there is a repeated forced expiratory effort against an intermittently closed glottis, but, even without this, we know that there is sufficient disturbance of the cerebrum through greatly increased rate of breathing to cause very uncomfortable sensations in the head, and to produce momentary insensibility to pain.

In order to explain why one person should experience such disturbances from cough, and another not, is difficult, and we are obliged to resort to the old theory of idiosyncrasy. The fact that some of the patients had lost consciousness before, without cough, allows us to suppose that in case of predisposition to such condition the mode of excitation may be different in different attacks; that the tendency to lose consciousness may be acted upon in very different ways, just as a patient who is liable to syncope may faint from a variety of causes, *e. g.*, exposure to bad air, loss of blood, or simple emotion.

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